

THE INFLUENCE OF THE RUSSO-JAPANESE WAR ON MEDICAL AND ENGINEER OPERATIONS IN THE U.S. ARMY

A Monograph

by

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ABSTRACT

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TABLE OF CONTENTS

ACRONYMS	vi
INTRODUCTION	1
MEDICAL OPERATIONS	7
Key Lessons from the Russo-Japanese War	9
Preventive Medicine	10
Casualty Evacuation	12
Influence after the War	15
Institutional Education	15
Informal Education in Print	21
ENGINEER OPERATIONS	25
Key Lessons from the Russo-Japanese War	26
Influence after the War	29
Institutional Education	29
Informal Education in Print	36
WORLD WAR I	40
CONCLUSION	48
BIBLIOGRAPHY	51

ACRONYMS

FSR Field Service Regulation

JMIUS Journal of the Military Service Institution of the United States

INTRODUCTION

When Japan defeated the Russian Empire in the Russo-Japanese War, it gained control over Manchuria and Korea. The victory stunned most Western countries and changed the delicate balance of power that held Europe together. The war moved the declining Russian Empire closer towards a revolution and legitimized the aggressive modernization efforts of Japan. It polarized Europe into two opposing camps that would eventually clash during World War I. It also laid the seeds for the eventual confrontation between the United States and the Japanese in December 1941. Despite this, for the past century the world has largely forgotten the war.¹ Overshadowed by both World Wars and the Cold War, changing political conditions since the collapse of the Soviet Union have slowly renewed interest over the past two decades.² This is in contrast to immediately after the war when international interest was significant.

Throughout the war, international observers and journalists provided a range of reports for civilian and military leaders to examine. Eighty-three officers from 15 countries augmented military attaches to observe the war. A number of military leaders who served during World War I as future commanders of armies, corps, and divisions, traveled to Manchuria during the war.³ Theirs and other published accounts provided a comprehensive assessment of the war that western nations meticulously studied.

A year after the war, General Sir John French, who later served as the commander of the British Expeditionary Force in France and Belgium during World War I, advocated the need for study of the war's lessons on static positions, firepower, and operations at

¹Rotem Kowner, *The A to Z of the Russo-Japanese War* (Lanham, MD: Scarecrow Press, 2009), xii.

²Rotem Kowner, ed., *The Impact of the Russo-Japanese War* (New York: Routledge, 2007), xvi.

³Yigal Sheffy, "A Model not to Follow: the European Armies and the Lessons of the War," in *The Impact of the Russo-Japanese War*, ed. Rotem Kowner (New York: Routledge, 2007), 256.

night. Despite these statements, eight years later French appeared stunned by the nature of a world war with characteristics that resembled the lessons he previously advocated.⁴ Not surprisingly, French and other Western military leaders endured significant criticism for their failure to recognize the Russo-Japanese War as a precursor to World War I. Many labeled the European and American armies as obstinate cultures who viewed the war as an anomaly.⁵

While some of these statements are accurate, the lessons learned from the war did ignite a long, intense discussion in the U.S. Army. The U.S. Army sent a number of officers as observers and the group published five official accounts of their observations. Many of the observers would achieve prominent positions of influence in the Army, particularly at Fort Leavenworth. One, Peyton March, later became the Army Chief of Staff and, another, John Pershing would lead the American Expeditionary Force during World War I. Their reports and accounts from other witnesses permeated throughout the force through professional journals and military schools for several years after the war. Some of the lessons directly influenced the U.S. Army's organization, training, and doctrine by introducing new concepts or providing additional evidence to ongoing debates. Even today, the lessons learned from observer accounts and subsequent discussions in professional journals, is a tradition that remains an important part of the Army's culture. Within this context, this study examines how lessons learned from the Russo-Japanese War influenced the U.S. Army from 1905 - 1914.

The literature on the war varies. Far less literature on the war exists than most other major wars of the 20th century. Historians and other academics have published a variety of works since the end of the Cold War. The literature has examined a wide breadth ranging from the

⁴Yigal Sheffy, "A Model not to Follow: the European Armies and the Lessons of the War," 253.

⁵See Thomas Kuhn for an extensive discussion on anomalies. Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 3rd ed. Chicago, IL: University of Chicago Press, 1996), 46-57.

development of technology in twentieth century warfare to the influence of the war on nationalism. Reviewing this literature, several themes emerge regarding the influence of the war. Three of the major themes examined are the geopolitical influence of the war, the subjective lens through which Western armies studied the war and the war's influence on Western military thought from 1905-1914. These themes warrant examination as they give important context and identify where this paper will fill a gap in the current literature.

The war had significant geo-political implications beyond eastern Asia. Although it involved only Russia and Japan as belligerents, they fought in two other countries, Korea and China. Additionally, third party markets financed the war for both countries.⁶ The defeat of Russia by a non-western power strengthened nationalist movements in European colonies, particularly British colonies.⁷ Another geopolitical influence of the war was its relationship to the unraveling of the European balance of power. This occurred through the hardening of two major alliances and the ensuing arms race that followed the war.⁸ Facing defeat in Asia, Russia turned west. Germany continued its growth in both industry and military strength, while it became increasingly suspicious of its Russian and French neighbors. A psychological change also occurred following the war. Belief that the military could obtain national objectives in a limited war became a common perspective in Europe.⁹

⁶John Steinberg et al, *The Russo-Japanese War in Global Perspective: World War Zero* (Leiden: Brill, 2005), xix.

⁷Steven Marks, "'Bravo, Brave Tiger of the East!' The Russo-Japanese War and the Rise of Nationalism in British Egypt and India," in *The Russo-Japanese War in Global Perspective: World War Zero*, ed. John Steinberg et al (Leiden: Brill, 2005), 610.

⁸Rotem Kowner, "The High Road to the First World War? Europe and the Outcomes of the Russo-Japanese War, 1904–14," in *Rethinking the Russo-Japanese War, 1904-05 Volume 2: The Nichinan Papers*, John Chapman and Chiharu Inaba, eds. (Folkestone: Global Oriental, 2007), 294.

⁹Rotem Kowner, "The High Road to the First World War? Europe and the Outcomes of the Russo-Japanese War, 1904–14," 309. David Walder's *The Short Victorious War: the Russo-Japanese Conflict, 1904-5* (New York,: Harper & Row, 1974) also briefly discusses the geo-political impacts regarding Russia's turn to the west and the rise of Germany.

A second major theme of the literature concerns how subjective views allowed Western armies to misinterpret the lessons of the war, particularly the role of morale and the offensive. The Second Boer War ended in 1902 and challenged contemporary Western military thought that the frontal assault and offensive, as a whole, were superior to the defense. Although it generated discussions about the changing nature of warfare, military leaders treated the war as an anomaly due to its colonial location and the irregular nature of the Boers. The much larger Russo-Japanese War could not be disregarded as easily.¹⁰

Between the Russo-Japanese War and World War I, military leaders focused on the lessons through their subjective lenses. Although the quantity of lessons was significant, Western military leaders used them to validate rather than challenge existing beliefs. In France, the military used the offensive as a method to advocate the importance of a large, professional army over a small standing force that simply trained conscripts when faced with war.¹¹ Britain favored the offensive based on its experience in colonial warfare. This was in spite of evidence presented during the Russo-Japanese War that modern weaponry created a deadly zone of death in front of defensive positions.¹² Observers also noted the importance of using the machine gun in the

¹⁰See European and American skepticism of the Boer War in T.H.E. Travers, "Technology, Tactics, and Morale: Jean de Bloch, the Boer War, and British Military Theory, 1900-1914," *The Journal of Modern History* 51, no. 2 (June 1979): 269 and Tervor Dupuy, *The Evolution of Weapons and Warfare and American Military History and the Evolution of Warfare in the Western World* (Fairfax: Hero Books, 1984).

¹¹Yigal Sheffy, "A Model not to Follow: the European Armies and the Lessons of the War," in *The Impact of the Russo-Japanese War*, 258, see also Michael Howard, "Men Against Fire: Expectations of War in 1914," *International Security* 9, no. 1 (Summer, 1984): 519-520, for French concerns over professionalism and an overcautious approach to warfare

¹²See Yigal Sheffy, "A Model not to Follow: the European Armies and the Lessons of the War," in *The Impact of the Russo-Japanese War*, 258; JFC Fuller, *The Conduct of War, 1789-1961: A Study of the Impact of the French, Industrial, and Russian Revolutions on War and its Conduct* (London: Minerva Press, 1968) briefly mentions the deadliness of machine guns in the war and the use of field entrenchments; see also Travers, "Technology, Tactics, and Morale: Jean de Bloch, the Boer War, and British Military Theory, 1900-1914," 264, on how the British viewed the relationship of morale and the offensive as the answer to technological changes that had shown the value of the defense over the offense,

modern army.¹³ Despite this, its procurement and use in Western armies, other than in Germany, was rather limited and varied based on funding and doctrinal concerns.

In “Russo-Japanese War: Lessons Not Learned,” James Sisemore argues another subjective interpretation of the war. Some nations focused on the Japanese forces’ use of discipline and morale to overcome devastating losses against fortified positions at Port Arthur and Mukden.¹⁴ If offensive tactics failed, it was because they were misused or underemployed and technical developments related to firepower could correct the issue. Not surprisingly, the use of indirect versus direct artillery became a much-discussed topic after the war. During the war, the Japanese successfully employed a mix of large and small caliber artillery along with hand grenades and trench mortars to overcome defenses.¹⁵ Some advocated that with proper employment of artillery barrages, the offense could break through the defensive line.¹⁶ Attacks would result in high casualties, but were acceptable for victory. Like morale and the offensive at the tactical level, morale of the army and the nation, became a key lesson of the war and a concern of western militaries that feared that populations had become overly cautious.¹⁷

¹³Daniel Kenda, “Lessons Learned from the use of the Machine Gun during the Russo-Japanese War and the Application of those Lessons by the Protagonists of World War I,” (Master’s thesis, United States Army Command and General Staff College, 2005) <http://cgsc.contentdm.oclc.org/utis/getfile/collection/p4013coll2/id/390/filename/391.pdf> (accessed September 10, 2013). Offers an interesting argument about why Western armies failed to embrace the machine guns. Military tactical culture, with a focus on the spirit of the offensive and the morale attributes in war, did not allow a place for the machine gun. Even the Russians, who utilized the machine gun extensively during the war, saw the bayonet as the most effective weapon on the battlefield. See pages 25 and 183.

¹⁴James Sisemore, “Russo-Japanese War: Lessons Not Learned,” (Master’s thesis, U.S. Army Command and General Staff College, 2003), 109. <http://cgsc.contentdm.oclc.org/cdm/ref/collection/p4013coll2/id/113> (accessed September 10, 2013).

¹⁵Ibid., 113.

¹⁶See also Robert Citino, *Quest for Decisive Victory: From Stalemate to Blitzkrieg in Europe, 1899-1940* (Lawrence: University Press of Kansas, 2002), 99 and Jonathan Bailey, “Military History and the Pathology of Lessons Learned: the Russo-Japanese War, case study” in *The Past as Prologue: The Importance of History to the Military Profession*, edited by Murray, Williamson and Richard Hart Sinnreich, (New York: Cambridge University Press, 2006), 176.

¹⁷Michael Howard, “Men Against Fire: Expectations of War in 1914,” 519.

The third major theme of the literature is the influence of the war on Western military thought. Most works addressing the development of the U.S. Army prior to WWI do not address or limit the influence of the war.¹⁸ Charles Payne, however, offers an extensive examination of the impact of the war on the development of western military thought. He focuses specifically on the development infantry, cavalry, and artillery between 1905 and World War I. Military officers were particularly concerned about moral factors and their link to infantry tactics after the war. Also discussed was the effect of entrenchments, night attacks, and the bayonet on the battlefield. This included the benefits of entrenchments to protect troops and the potential creation of overly cautious forces. Discussions on how to improve attacks with increased firepower on the modern battlefield were also prevalent.¹⁹ Like much of the other literature, Payne identifies that western analysts still believed that the war displayed the decisive role of the offensive, despite the high number of casualties the Japanese suffered.

Altogether, literature concerning the geopolitical influence of the war, the subjective lens through which Western armies studied it, and its influence on Western military thought from 1905-1914, offer a thorough assessment of the lessons learned. Despite this, there are still gaps regarding the influence of the war, including its effect on operational art. This study will focus on filling in one of those gaps by examining how lessons learned from the Russo-Japanese War influenced the U.S. Army from 1905 – 1914.

¹⁸For example see Oliver Spaulding, *The United States Army in War and Peace* (New York: Putnam's Sons, 1937), Russell Frank Weigley, *History of the United States Army* (New York: Macmillan, 1967) and Richard Stewart, *American Military History*. Richard Stewart, ed., *American Military History* (Washington, DC: Dept. of the Army, 2005) Michael Bonura, *Under the Shadow of Napoleon: French Influence On the American Way of Warfare from the War of 1812 to the Outbreak of WWII* (New York: NYU Press, 2012) and Timothy Nenninger, *The Leavenworth Schools and the Old Army: Education, Professionalism, and the Officer Corps of the United States Army, 1881-1918* (Westport, Conn: Greenwood Press, 1978).

¹⁹Charles Payne, "The Russo – Japanese War: Impact on Western Military Thought prior to 1914," (Master's thesis, University of Georgia, 1990), 42.

Lessons from the Russo-Japanese War improved the U.S. Army's ability to conduct sustained offensive operations through changes in medical and engineer operations. In medical operations, lessons on successful Japanese preventive medicine and casualty evacuation procedures led to efforts to extend the culminating point of forces through better integration of medical and operational planning. In engineer operations, these lessons led to an increased emphasis on the use of fortifications to enable improved control of tempo during offensive and defensive operations. The catalyst for these changes was through officer education from 1905-1914. This work will analyze medical and engineer operations in two sections. First, each section will describe accounts of U.S. Army observers and other sources to capture lessons learned. Second, each will analyze the influence of these lessons within institutional education at Fort Leavenworth and through informal education in professional military journals. This work will conclude with a short examination of medical and engineer operations during World War I.

MEDICAL OPERATIONS

Between the end of the U.S. Civil War and the beginning of the Spanish-American War, the experiences of the Army's medical officers were limited to small, decentralized operations, largely on the frontier. These experiences failed to prepare the Army's medical officers to support large-scale operations during the Spanish-American War. Requirements at the onset of the war quickly exceeded the capabilities of the Medical Department. By the end of operations in Cuba, the effects of inadequate casualty evacuation and preventive medicine procedures were obvious. After the last battle, only 350 of 600 of Theodore Roosevelt's 1st United States Volunteer Cavalry (Rough Riders) were fit for duty due to wounds, diseases, and poor living conditions. Within a few days, it was only 100. A little over two weeks later, the entire V Corps essentially culminated

over the same issues.²⁰

Leaders recognized the necessity to change organization, training, and management of medical operations at the tactical and national level.²¹ This was in line with broader efforts across the United States that began a decade prior. Towns and cities focused on improving sewage and water supply.²² Civilian medical doctors also brought European medical standards to the United States. Over several years following the war, there were also significant efforts in Puerto Rico and Panama to combat disease. Secretary of War Elihu Root's reforms began to permeate across the force. Unfortunately, although Army leadership recognized that it had significant manning issues, such as a shortage of trained physicians to support large-scale operations, Congress did not initially support growth. By 1904, the ratio of medical officers to soldiers was half of the Spanish American War levels.²³ It was within this context of attempts to improve medical operations and a renewed interest in preventing the spread of diseases that military observers witnessed the Russo-Japanese War.

This section argues that lessons on medical operations from the Russo-Japanese war improved the U.S. Army's ability to conduct sustained offensive operations. In medical operations, these lessons led to efforts to extend the culminating point of forces through better integration of medical and operational planning. The Japanese success with casualty evacuation procedures and preventive medicine demonstrated that Army leaders and planners could not treat medical operations as an afterthought to tactical operations. The Army recognized that both line and medical officers must better understand their roles in medical operations, particularly preventive medicine and casualty evacuation procedures. In order to achieve this, a deliberate

²⁰Mary Gillett, *The Army Medical Department, 1865-1917*, 118 and 149.

²¹Mary Gillett, *The Army Medical Department, 1865-1917*, 313.

²²*Ibid.*, 94.

²³*Ibid.*, 318.

effort began at Fort Leavenworth to integrate medical and tactical operations and promote the roles of line and medical officers in the process. Discussions in professional military journals reinforced this reform. In examining these two areas, this section will discuss the key lessons learned during the war focusing on preventive medicine and casualty evacuation procedures. It will then analyze how the lessons influenced medical operations within the army.

Key Lessons from the Russo-Japanese War

The U.S. Army sent observers to both belligerents during the war. Colonels Valery Havard and John Van R. Hoff, Assistant Surgeon-Generals, both observed Russian Army operations and to a lesser extent Japanese operations. Havard began his observations by concisely laying out the characteristics of the environment and the battles. Both significantly affected medical operations. Many of the characteristics were eerily similar to conditions faced by Western Europeans ten years later. The sizes of the forces at several of the key battles were quite large when compared to U.S. Army operations in Cuba. Four hundred thousand men fought at Liaoyang, 475,000 at the Sha River, and 800,000 at Mukden.²⁴ Casualties at Liaoyang were approximately 20,000 Japanese and 18,000 Russians. The line of battle was 60 miles at the Sha River. At Mukden, it was 80 miles.²⁵ The distances made it difficult for chief surgeons to communicate with lower organizations. Division level units therefore had to be capable of independent operations.²⁶ The characteristics of the environment and various battles offered a variety of lessons on preventive medicine and casualty evacuation procedures during large-scale operations. More importantly, the war demonstrated the benefits of organization and preparation

²⁴War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2 (Washington, DC: Government Printing, 1906), 5.

²⁵*Ibid.*, 5

²⁶*Ibid.*, 7.

for medical operations.

Preventive Medicine

MAJ Charles Lynch expressed his desire to treat the subject of sanitation in detail “in view of the importance of the subject, the interest which it has excited, and the general uncertainty as to what has been accomplished.”²⁷ Lynch was one of two Army Medical Department’s observers of the war and would continue to be influential in the department through World War I. Given the issues with sanitation during the Spanish-American War, continued interest was hardly surprising.²⁸ Lynch argued that the Japanese understood the importance of hygiene and its impact on the effectiveness of force. While they were “willing to expend lives in fights of the most desperate and sometimes reckless character, they consider the life of each single soldier too valuable to sacrifice it to a disease which is preventable.”²⁹ Beyond that, Lynch argued that it was part of their larger national character. A soldier who returned home due to a preventable disease suffered great shame. Similarly, higher authorities questioned a commander who lost a significant number of soldiers to preventable diseases. Commanders had a clear responsibility in medical operations.

Lynch meticulously recorded the role of medical officers in preventive medicine. Medical officers addressed sanitation issues by advising unit commanders. Units were required to submit routine sanitation reports to the division surgeons every ten days and to the division commanders

²⁷War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2, 145.

²⁸Some of the sources used sanitation and hygiene interchangeably and as terms for various aspects of related medicine. For this paper, preventive medicine is used as much as possible to relate sanitation and hygiene to its current definition.

²⁹War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2 (Washington, DC: Government Printing, 1906),145.

every ten days in the field.³⁰ During a campaign, regimental level leaders normally appointed a sanitary committee. Typically headed by the regimental surgeon, this committee focused on hygiene. Division surgeons also regularly conducted sanitary inspections. During the war, the Chief of the Medical Bureau of the War Department made two visits himself to inspect medical operations, including sanitary conditions.³¹ Local line commanders also took the sanitary conditions of the Chinese in Manchuria seriously. They established sanitary committees to address issues similar to boards of health including inspection of food and epidemics.

When referring to the quick identification of contagious disease, MAJ Lynch argued, that the Japanese “experience has more clearly proved the necessity for this and immediate removal of infected from well men than any previous observation.”³² Medical personnel quickly identified and quarantined soldiers suspected of infection. Based on the circumstances, patients moved as far as possible to the rear. Water-borne diseases were also of particular concern to the Japanese army. Medical personnel recognized that flies played a role in spreading diseases and enacted measures to reduce their contact to food. These measures, which included boiling water and properly cleaning utensils, allowed the Japanese to have an estimated one sixth the cases of typhoid and dysentery that the Russians did.³³ MAJ Lynch further argued that the Japanese had superior hygienic procedures than even the Germans in the Franco-Prussian War.³⁴ Overall, the Japanese presented an army that placed great importance on preventive medicine procedures through effective planning and a clear understanding of the roles of line and medical officers in the process.

³⁰War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2, 151.

³¹Ibid., 152.

³²Ibid., 174.

³³Ibid., 178.

³⁴Ibid., 185.

When describing Russian forces, Colonel Havard noted the importance placed on preventive medicine procedures by their leaders. “It is evident that the lessons of the past have borne some fruit and we may fairly hope that the wars of the future will not be attended with the frightful mortality from camp disease.”³⁵ The approximate proportion of deaths from diseases to death from wounds was only 6,000 to 47,000 or a ratio of one to eight.³⁶ When Port Arthur surrendered in February 1905, there were only three cases of Typhoid fever and 48 of dysentery among a population of more than 40,000.³⁷ Considering the Union Army lost 24.77 men per 1000 from dysentery during the Civil War, the number of dysentery cases at Port Arthur was minute.³⁸ Havard attributed these successes to several factors. Although sanitary conditions at camps were poor at the beginning of the war, the Russian leadership made efforts to improve sanitation through the procurement of adequate medical supplies, funding, and food. The commanding general took interest in sanitation and personally inspected hospitals.³⁹ Colonel Hoff supported these observations. He noted, “the Russians regarded the work of the sanitary department as of real military importance.”⁴⁰ Hoff advocated that the U.S. Army must recognize the importance of its sanitary personnel and related operations as the Russians did.

Casualty Evacuation

The Japanese medical department organization and their efficient evacuation procedures impressed U.S Army cavalry officer Lieutenant Colonel Edward McClernand. In time of war,

³⁵War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2, 74.

³⁶*Ibid.*, 77.

³⁷*Ibid.*, 80.

³⁸*Ibid.*, 190.

³⁹*Ibid.*, 82.

⁴⁰*Ibid.*, 121.

“each division has a medical detachment, three to six field hospitals, two sanitary (bearer) companies, and a proper proportion of riding and baggage horses.”⁴¹ Units first evacuated casualties to battalion level dressing station. From there the sanitation company transported the wounded to the principal dressing station. They also provided the forward battalion support if needed. Medical personnel evacuated the patients from principal dressing stations to field hospitals if required.⁴² Stationary field hospitals were further to the rear, in more static locations, typically along the lines of communication. Their procedures offered an effective system on the modern battlefield.

MAJ Lynch provided a number of conclusions from his observations of the Japanese Army. Having a large pool of trained medical personnel and equipment well before the onset of hostilities was important. War requirements, not requirements for operations during peace, determined active duty medical officer numbers. A significant number of Japanese reserve officers conducted frequent medical maneuvers.⁴³ He also argued that Japanese army leaders effectively organized the medical department to support war efforts and had greater success than any other nation in any previous war.⁴⁴ Identifying responsibility for the care of all sick and wounded was critical. An evacuation process that maintained rapid evacuation of wounded from the battlefield also impressed Lynch.⁴⁵ Line officers ensured unwounded soldiers remained or quickly returned to the line when escorting fellow soldiers to care.⁴⁶ Lynch also noted the

⁴¹War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 5 (Washington, DC: Government Printing, 1907), 43.

⁴²War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2 (Washington, DC: Government Printing, 1906), 44.

⁴³War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 4 (Washington, DC: Government Printing, 1907), 205.

⁴⁴*Ibid.*, 204.

⁴⁵*Ibid.*, 199.

⁴⁶War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2, 76.

enforcement of standards by unit commanders, who clearly understood their responsibilities in the casualty evacuation process.

Unlike their Japanese counterparts, the Russian Medical Department did not have complete autonomy and observers witnessed the results of failure to integrate operational and medical planning. While they had successful management of preventive medicine issues, they had challenges with organization and casualty evacuation. Chief Surgeons controlled field and base hospitals. Line officers controlled transportation, sanitary trains, and evacuation.⁴⁷ In Havard's opinion, this divided responsibility was a mistake. In the field, the entire medical department was under the command of a line major general, not a chief surgeon. A chief medical inspector worked with him and had some authority over the armies' medical operations. Unfortunately, the exact delineation in their authorities was unknown.⁴⁸ Russian line officers also looked at Russian military surgeons as outsiders. Unlike the Japanese, the Russians made no effort at the dressing stations to tag personnel for identification. Each corps had approximately one sanitary convoy or transport column, which served as auxiliaries to evacuate casualties from the battlefield.⁴⁹ Unfortunately, management of both the transport columns and bearer companies appeared unorganized after major battles such as Mukden. Line officers appeared negligent in their duties, while medical officers were not encouraged to become involved in duties outside their responsibilities, such as casualty evacuation.⁵⁰

Overall, contrasting observations of Russians and Japanese medical operations gave reformers at Fort Leavenworth a plethora of lessons to study. The Japanese presented an army that successfully extended the culmination point of their forces through effective preventive

⁴⁷War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 2, 36.

⁴⁸*Ibid.*, 37.

⁴⁹*Ibid.*, 40.

⁵⁰*Ibid.*, 48.

medicine and casualty evacuation procedures. They understood the value of relationship between tactical and medical operations. They also ensured that both line and medical officers clearly understood their roles in medical operations.

Influence after the War

The lessons of medical operations during the Russo-Japanese War permeated quickly through army professional military education and military journals. Although the official observer reports were not published until 1906-1907, their authors, journalists, and other observers immediately published many of the lessons in various mediums. Officers at Fort Leavenworth deliberately integrated medical and operational planning and promoted the roles of line and medical officers in the medical operations. Discussions in professional military journals reinforced these efforts. As a result, lessons learned in the war influenced a broad range of military officers.

Institutional Education

Prior to the war, then Lieutenant Colonel John Van R. Hoff taught at Fort Leavenworth at the General Service and Staff College. Hoff served as the head of the Department of Military Hygiene. In 1903, the commandant of the school noted that the time allotted for the hygiene course was insufficient, but that Hoff was diligently doing his duty. Hoff's service as the surgeon for the largest post in the U.S. Army and head of the department did not "do full justice to the course."⁵¹ Despite recent events in Cuba and public concern over the issue of sanitation, Hoff argued that school leadership only grudgingly added the course to the school. It had the least

⁵¹General Service and Staff College, *Annual Report For the Year 1903* (Fort Leavenworth, KS: Staff College Press, 1903), 7. This was an issue with several departments within the school in which officers had both post and school teaching responsibilities.

weight of all the courses and the program outline was lacking.⁵² Hoff proposed that the course be expanded and placed on similar standing with other branch courses. Hoff also argued that there must be recognition of both line officers and medical officers in their shared responsibility in medical operations “before a perfect fighting machine can be evolved.”⁵³ Hoff further recommended that all post schools should have a course in military hygiene and that practical exercise, demonstrations and problems replace the textbook.⁵⁴

The events in Manchuria occurred as the Army identified a need for a transition to a more practical approach in teaching medical operations. In 1906, the Army separated the General Service and Staff College into the Infantry and Cavalry School and a Staff College.⁵⁵ Only select students would attend the latter. Although Hoff departed the school in May 1905 to observe the war in Manchuria, its lessons had already begun to influence his department. His second lecture titled, *The Medical Department in the Field* included data from the war.⁵⁶ Hoff expressed his frustration that the Army’s General Staff had minimized some of his recommendations in regards to the instruction of “Care of Troops” and its desired treatment as an important art necessary for success as a line officer.⁵⁷ He was concerned over the Army’s culture of limiting military hygiene to a special profession rather than with the “fighting department.” In other words there was a

⁵²Ibid., 60. The school offered the course over a month long period at the end of the school year. The textbook was Alfred Woodhull’s *Notes on Military Hygiene*, which was based on Edmund Parkers’ *Manual of Practical Hygiene*, a work originally printed in 1864. Brigadier General Woodhull had delivered a series of lectures in 1889 at the Infantry and Cavalry School at Fort Leavenworth. His lectures were compiled, printed in 1890, and revised in 1898. They would later be revised again in 1904 and 1909.

⁵³General Service and Staff College, *Annual Report for the Year 1903*, 57.

⁵⁴General Service and Staff College, *Annual Report of the Commandant For the School Year Ending August 31, 1904* (Fort Leavenworth, KS: Staff College Press, 1904), 53-54.

⁵⁵In 1907 the School of Infantry and Cavalry would be renamed the School of the Line.

⁵⁶J. Van R. Hoff, “The Medical Department in the Field,” (lecture, Department of Military Art, Infantry and Cavalry School, Fort Leavenworth, KS, 4. <http://www.cgsc.edu/carl/resources/archival/lectures.asp> (accessed September 15, 2013).

⁵⁷Infantry and Cavalry School and Staff College, *Annual Report of the Commandant For the School Year Ending August 31, 1905* (Fort Leavenworth, KS: Staff College Press, 1905), Appendix E, 13.

distinct disconnect between medical and operational planning.

By the academic year ending in August 1905, the school began incorporating lectures on the Russo-Japanese War into its Department of Military Art.⁵⁸ In 1906, the head of the renamed department recommended transfer of the Department Care of the Troops to the Department of Military Art, within the subject of “Troops in Campaign.”⁵⁹ The recommendation occurred for several reasons. Most importantly, the school recognized that “Care of Troop” was inseparable from “Troops in Campaign.” This offered a less theoretical and more practical course aimed at line officers. MAJ John Morrison, fresh off duty in Manchuria, reported in September 1906 to instruct with the Department of Military Art at both schools. The commandant, BG Charles Hall noted that upon his return from the war, “his observations and deductions have been of great help to him as an instructor in military art and also of much value and interest to the students.”⁶⁰

In 1908, Morrison described his effort to harmonize the subject of hygiene and tactics in campaigns by “doing away with a written examination in Hygiene, [and] submitting problems that require practical application of the knowledge.”⁶¹ For example, in examining a several day march of troops, students were required to analyze both tactical and sanitary requirements. The focus moved from theory and into practical application. The Army Staff College continued a separate course on more advanced topics involving sanitation and a new series of lectures focused

⁵⁸Infantry and Cavalry School and Staff College, *Annual Report of the Commandant For the School Year Ending August 31, 1905*, Appendix B, 17.

⁵⁹U.S Infantry and Cavalry School, *Annual Report of the Commandant For the School Year Ending August 31, 1906* (Fort Leavenworth, KS: Staff College Press, 1906), Appendix D, 13.

⁶⁰U.S Infantry and Cavalry School, Signal School, and Staff College. *Annual Report of the Commandant For the School Year Ending August 31, 1907* (Fort Leavenworth, KS: Staff College Press, 1907), 25.

⁶¹Army Service Schools, *Annual Report of the Commandant of the Army Service Schools at Fort Leavenworth for the School Year Ending August 31, 1908* (Fort Leavenworth, KS: Staff College Press, 1908), 20.

on communicable diseases.⁶² By 1908, Morrison wrote that under MAJ Edward Munson the course in “Care of Troops” in the School of the Line was the best he had seen.⁶³ It continued to move away further from classroom theory and closer to practicality. Munson addressed not only the care of troops but also medical organization as whole. Focus in the Staff College course was on the importance of care of troops in regards to troop economics, linking military sanitation to the planning and execution of operations.⁶⁴ By 1910 another evolution in sanitary education in the Army occurred. A Correspondence School for Medical Officers facilitated “the management of the sanitary services in war, and through its resulting usefulness cannot fail to prove of incalculable military and humanitarian value to the rest of the army.”⁶⁵ This further reinforced efforts to educate medical officers on their role in medical operations.

During this time, Munson, with Morrison, also co-authored *A Study in Troop Leading and Management of the Sanitary Service in War*.⁶⁶ The work codified the classroom instruction given to students. Munson intended the work to “give some idea of the inter-dependent and detailed operations of the tactical and sanitary mechanism of a large military unit in modern war.”⁶⁷ There were several audiences for the work. It offered line officers at other posts a description of the Medical Department’s functions and its support to tactical and humanitarian

⁶²Army Service Schools, *Annual Report of the Commandant of the Army Service Schools at Fort Leavenworth for the School Year Ending August 31, 1908*, 93.

⁶³Army Service Schools, *Annual Report of the Commandant of the Army Service Schools at Fort Leavenworth for the School Year Ending August 31, 1909* (Fort Leavenworth, KS: Staff College Press, 1909), 14. Also in 1908 John Morrison would assume duties as the assistant commandant overseeing both the Army School of the Line and the Army Staff College.

⁶⁴Army Service Schools, *Annual Report of the Commandant of the Army Service Schools at Fort Leavenworth for the School Year Ending August 31, 1909*, 71.

⁶⁵Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1910), 62.

⁶⁶In *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 1, Morrison records his observations of Russian medical evacuation and sanitation during the war, see pages 39, 41, 129, 132.

⁶⁷John Morrison and Edward Munson, *A Study in Troop Leading and Management of the Sanitary Service in War* (Leavenworth, KS: Ketcheson Printing Co, 1910), preface.

operations. The other audience was new medical officers. It offered them a guide to their duties outside of routine support to sick and wounded during campaigns.⁶⁸ Around the same time, Col Valery Havard, another observer of the war, published his *Manual of Military Hygiene for the Military Services of the United States*. The work largely addressed infectious diseases but also had chapters on physical fitness, recruiting standards, hygiene, and other topics.⁶⁹ Multiple observers from the war had now offered texts related to medical operations.

By 1910, the influence of lessons of the war was also arguably present in army doctrine frequently referenced in the courses at Fort Leavenworth. In 1905, the Army published the first *Field Service Regulations* (FSR). In the FSR published five years later, there were several changes related to better integration of operational and medical planning and the roles of line and medical officers in medical operations. The FSR directed commanders to keep “senior surgeons informed of contemplated movements in order that sanitary service may make proper preparation.”⁷⁰ Also added was a separate section on sanitary inspection. While the 1905 FSR directed medical inspectors to report their issues to the commanding officer and forward a copy of the report to the chief surgeon, the 1910 FSR directed that “it is the duty of all commanders to remedy the sanitary defects reported to them by sanitary inspectors.”⁷¹ This change in the language placed more responsibility on the commander to address sanitary issues rather than to receive reports of the sanitation inspector. In the event of a sanitary emergency, the 1910 FSR

⁶⁸John Morrison and Edward Munson, *A Study in Troop Leading and Management of the Sanitary Service in War*, 4.

⁶⁹Also published that year was MAJ Percy Ashburn’s *The Elements of Military Hygiene*.

⁷⁰U.S. War Department, Office of the Chief of Staff, *Field Service Regulations, United States Army, 1910* (Washington, DC: Government Printing Office, 1910), 185.

⁷¹U.S. War Department, General Staff, *Field Service Regulations, United States Army, 1905* (Washington, DC: Government Printing Office, 1905), 185. and *Field Service Regulations, United States Army, 1910*, 18.

also allowed the commander to authorize sanitary inspectors to direct changes in their name.⁷²

This authority was absent in the 1905 FSR.

The 1910 FSR also added a section concerning operations on the service line of communications. It gave control of the service line of communications to the chief surgeon. This included field hospital evacuation, patient transportation, and movement of medical supplies. Importantly, the FSR directed integration of these movements with plans designated by the overall commander of the line of communications, further emphasizing the inseparability of medical and operational planning.⁷³ This integration would prevent some of the issues the Russians had during the war.

The influence of the lessons on doctrine is also evident beyond the *Field Service Regulations*. The 1911 *Manual for the Medical Department* further expounded upon the roles of line and medical officers. It stated, “the chief surgeon of a field army is the medical and sanitary adviser of its commanding officer whom he will keep informed concerning the work of the Medical Department and consult regarding all matters of importance connected therewith.”⁷⁴ For his part to extend the culminating point of forces, the manual directed the chief surgeon to remove the sick and wounded so as they did not interfere with operations and prevent additional losses to the front. Like their Japanese counterparts, the chief surgeons were to be discriminatory and not evacuate pleading soldiers who could continue service at the front.⁷⁵

During the 1911 academic year, the Department of Care of Troops taught courses in five separate schools, adding instruction for the newly established Special School for Field Grades and

⁷²U.S. War Department, Office of the Chief of Staff, *Field Service Regulations, United States Army, 1910*, 181.

⁷³War Department, Office of the Chief of Staff, *Field Service Regulations, United States Army 1910*, 187.

⁷⁴U.S. War Department, General Staff, *Manual for the Medical Department, United States Army* (Washington, DC: Government Printing Office, 1911), 184.

⁷⁵*Ibid.*, 183.

Field Service School for Medical Officers to previously described courses. The former focused on sanitary organization and tactics.⁷⁶ Included in the school's curriculum for that year was a section from MAJ Joseph E. Kuhn on his observations the war, stressing the Japanese success due to their organization and preparation.⁷⁷ In 1912, Munson described his desire for a larger class of medical officers to attend the Field Service School for Medical Officers. To reach all majors in the regular Medical Corps it would be fifteen years.⁷⁸ Fortunately, the integration of operational and medical planning and the delineation of the roles of line and medical officers in medical operations had already gained significant momentum at Fort Leavenworth. Additionally, many of the medical officers who could not receive institutional education for several years had already received a significant amount of information on medical operations through other means. Professional military journals offered valuable lessons on medical operations from the war to an audience that was clearly engaged in their discussion.

Informal Education in Print

A brief examination of two military journals provides evidence of not only dissemination of lessons learned from the war but also the evolving conversation that occurred as the medical community debated lessons from the war.⁷⁹ Military hygiene and sanitation dominated many of the articles related to the war. MAJ Louis Seaman, although not officially a U.S. Army observer, sparked arguably the first major discussion of the lessons from the war. Upon his return to the

⁷⁶Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1911), 39.

⁷⁷See "Sanitation Field Service" in Field Service School for Medical Officers (Fort Leavenworth, KS: Staff College Press, 1912), <https://archive.org/stream/sanitaryfieldse00unkngoog#page/n7/mode/2up> (accessed September 20, 2013).

⁷⁸Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1912), 49

⁷⁹This examination attempts to capture the major themes presented in the two journals. The sheer number of articles is too long to attempt to address every issue discussed from the war related to casualty evacuation or preventive medicine.

United States, he spoke and later published a very lengthy article in the *Journal of the Association of Military Surgeons of the United States* in September 1905. He argued for a reorganization of the U.S. Army in which “a branch of service that grapples with the silent foe that kills 80% shall be recognized with equal rank and emoluments, with the other branches.”⁸⁰ The discussion following the article further articulates that the Executive Council of the journal, with a number of general and senior field grade officers, approved several resolutions presented by Seamen. The council sent a petition to the President to request further recognition of the importance of the subject of the “Care of Troops” in education at the service academies. In addition, the council sent a petition to Congress to reorganize the Medical Department similar to countries with advanced military sanitation.⁸¹ Seaman would respond later to critics in September 1906 when he again argued that the greater success of the Japanese army was not their military victories over the Russians, but their victory over the silent foe of preventable disease.⁸² His article generated a number of responses related to disease in Manchuria, reorganization of the medical department and the relationship of Japanese medical officers to line officers.⁸³ Already lessons of the war were influencing a range of medical officers both reading and writing for the journal.

Various persons also discussed lessons on organization and responsibilities within the medical department. Dr. Robert Smart added to the conversation on the relationship of medical officers to line officers from the perspective of a National Guard Officer. He eagerly described the changing environment in the military in 1909 when the commander of Fort Sheridan published an order that “the Surgeon is the Chief Sanitary Officer of the Post and Reservation all

⁸⁰Louis Seaman, “Observations in the Russo-Japanese War,” *The Military Surgeon: Journal of the Association of Military Surgeons of the United States* 16, (1905): 29.

⁸¹Louis Seaman, “Observations in the Russo-Japanese War,” 31.

⁸²Louis Seaman “The Real Triumph of Japan or the Conquest of a Silent Foe,” *The Military Surgeon: Journal of the Association of Military Surgeons of the United States* 16, (1905): 508.

⁸³Within the same volume, Colonel Havard published portions of his own observations during the war, see pg 531-546.

orders given by him in that capacity have the sanction of the Commanding Officer and must be obeyed promptly.”⁸⁴ He hoped that such an order would be a precursor to further General Orders that would eventually set the conditions for the Army Medical Department to combat disease as successfully as the Japanese did in the war. Smart acknowledged that regular units had made gains regarding sanitation issues by education of line officers and the National Guard should follow suit for its own officers.⁸⁵

At the beginning of 1909, MAJ Charles Mason provided his recommendations for thorough changes in the Army Medical Department. As observers had noted during the war, Mason recommended a medical organization built for a wartime-sized army. He also discussed the need for a better understanding of the Red Cross, changes in equipment, and specialization in the medical department in areas such as sanitation. Mason further argued that unit medical officers should have the responsibility of sanitation.⁸⁶ He noted that in 1906 and 1908 at summer camps the surgeon general’s approved concept of placing sanitary squads under command of unit medical officers was successfully tested. Mason also suggested a correspondence course to assist in the instruction of militia surgeons; this course would become a reality in 1911 at Fort Leavenworth.

⁸⁴Robert Smart, “The Study of Military Hygiene for the National Guard Officer,” *The Military Surgeon: Journal of the Association of Military Surgeons of the United States* 24, (January 1909): 124.

⁸⁵Robert Smart, “The Study of Military Hygiene for the National Guard Officer,” *The Military Surgeon: Journal of the Association of Military Surgeons of the United States* 24 (January 1909): 125. Colonel Phillip Harvey argued similarly in the recommendation to follow Japan’s example and the relationship of their medical department officers with others in the military, see *Journal of the Military Service Institution of the United States*, 42 (April 1908), 112-118. Brigadier General (Retired) Woodhull, whose text was utilized by the schools at Fort Leavenworth for well over a decade, also argued about the importance of the line officer and medical officer relationship in a lengthy article “The Scope of Teaching that Should be Followed in the Newly Established Chair of Hygiene and Sanitation in our Military and Naval Schools, and the Practical Results to be Expected Thereon” *Journal of the Military Service Institution of the United States* 42 (April 1908), 157-192. MAJ Charles Lynch would submit the same titled essay with his thoughts in the journal, Volume 44, 193-214.

⁸⁶Charles Mason, “The Medical Department of the United States Army: Upon What Lines Should Much Needed Reorganization be Instituted?” *Journal of the Military Service Institution of the United States* 44, no. 157 (1909): 2.

Both Edward Munson and Charles Lynch would examine the question of sanitary responsibility in an essay contest in 1910 in *JMIUS* with extensive submissions. Their articles showed the evolution of the conversation of medical operations, including lessons from the war and concrete changes within the U.S. Army. Munson argued that with line officers involving themselves in sanitation, progress was occurring. He provided three unit orders that described varying degrees of authority and responsibility placed on the medical officer. He identified the ideal order as one that offered the medical officer executive authority over sanitation but did not relieve line officers of responsibility.⁸⁷ This relationship was much closer to the Japanese model during the war. In his essay, Lynch similarly described the responsibility of sanitation placed on Japanese commanders. *Field Service Regulations* had identified the need for sanitary inspectors, but the ultimate responsibility for sanitation lied with unit commanders. The executor of inspections should be the medical officers who were the commander's representatives on the subject of sanitation.⁸⁸ Even though the Army did not enact many of the recommendations in the articles, the culture allowed and supported the discussion of changes in the medical department.

Another article published in 1910 displayed the growing influence of the lessons of the war on the culminating point of forces and emphasis the role of line and medical officers during medical operations. The author argued that the goal of both line and medical officers was success in operations. "Without co-operation, success is unattainable. If the medical officer fails to play his part in removing the sick and wounded, and thereby ties the hands of his commander, the

⁸⁷Edward Munson, "Should Medical Officers be Held Directly Responsible for the Sanitation and Health of the Troops with Whom They Serve and if so What Should be Their Powers and Responsibilities," *Journal of the Military Service Institution of the United States* 46, no. 163 (1910): 398.

⁸⁸Charles Lynch, "Should Medical Officers be Held Directly Responsible for the Sanitation and Health of the Troops with Whom They Serve and if so What Should be Their Powers and Responsibilities," *Journal of the Military Service Institution of the United States* 46, no. 163 (1910): 411.

game is lost.”⁸⁹ The author referenced the Russo-Japanese War to describe the necessity of line troops assisting sanitary personnel. He also outlined the surgeon’s responsibilities and argued why the removal of sick and wounded was vital during the battle. He cited multiple military observers of the war to support his argument that an efficient system of evacuation must exist along the lines of communication to prevent casualties from impending mobility. Finally, he argued the danger of infection from slow removal of sick and wounded. The author of this article, a field artillery officer, represented a greater pool of officers in the U.S. Army that appreciated the importance of both medical evacuation and preventive medicine operations on the battlefield. He understood the correlation between extending the culminating point of forces and effective medical operations. He also understood the necessity to integrate operational and medical planning and understood the role of a line officer in the process. His concluding words, quoted earlier, do well to show progress made by the education received through both institutional education and the military journals after the war.

ENGINEER OPERATIONS

For the first half of the nineteenth century, engineer operations in the U.S. Army focused on coastal defense, infrastructure development, land surveying and other civil works tasks. With the onset of the Civil War, engineer units’ responsibilities included these traditional duties but grew to include clearing obstacles, constructing palisades and blockhouses and emplacing field fortifications.⁹⁰ Field fortifications would play an important role in the conflict. Their place on the battlefield expanded throughout the war, but inconsistently and only after a major engagement.

⁸⁹Manus McCloskey, “Importance of the Service of the Evacuation of the Sick and Wounded by the Medical Department in Time of War,” *Journal of the Military Service Institution of the United States* 47, no. 166 (1910): 192.

⁹⁰William Baldwin, *The U.S. Army Corps of Engineers: A History.*, 2nd ed. (Alexandria, VA: Bernan Assoc, 2008), 106.

Following the war, the U.S. Army's regular engineers returned to their traditional civil works tasks for the remainder of the nineteenth century. While the focus of the Corps of Engineers turned to the construction of the Panama Canal in the early twentieth century, events half way around the world would help to reinvigorate discussion on engineer operations beyond civil works projects.

While engineer operations during the Russo-Japanese War were not revolutionary, the war offered observers lessons of their use on the modern battlefield. This section argues that lessons on engineer operations from the Russo-Japanese war improved the U.S. Army's ability to conduct sustained offensive operations. These lessons led to an increased emphasis on the use of fortifications to enable improved control of tempo during offensive and defensive operations. Like medical operations, there was a deliberate effort at Fort Leavenworth to engrain these changes through professional education. Discussions in professional military journals reinforced this effort. In analyzing the influence of the war on engineer operations, this section will discuss the key lessons learned during the war and describe how the lessons influenced engineer operations within the U.S. Army after the war.

Key Lessons from the Russo-Japanese War

In his published report, Major Joseph Kuhn, an engineer officer, provided a comprehensive assessment of engineer operations during the war. Kuhn believed that while the war did not necessarily provide revolutionary concepts on field fortifications, it displayed their use during large, protracted operations on a modern battlefield. Although employed less extensively than Russian forces, Japanese use of field fortifications impressed Kuhn. He noted that the Japanese primarily designed fortifications to support offensive operations while Russian primarily designed theirs to support a protracted defense.

Kuhn examined fortified Japanese lines at Liaoyang, Mukden, and several smaller

locations. When examining fortifications, Kuhn observed that the Japanese typically used smaller parapets and wider trenches than the Russians.⁹¹ The Japanese parapets were better for concealment but their trenches more exposed to shrapnel. These wider trenches did offer a distinct advantage; they secured lateral communication.⁹² At Mukden, the Japanese dug ditches 20 to 30 feet in front of their main trenches that were connected to the main fire trenches. Both secured lateral communication and the ditches enabled Japanese troops to assume offensive operations more quickly than their more defensive-minded Russian counterparts. Japanese soldiers' use of small ten-inch berms to support more accurate firing also impressed Kuhn. Although they offered less cover, the Japanese trenches incorporated vegetation or straw for better concealment than the Russian trenches. To maintain the offensive mindset of their units, they typically only employed overhead cover when the forces were in close proximity for a significant time.⁹³

During offensive maneuvers, the Japanese often constructed hasty entrenchments as they advanced. Soldiers dug the trenches with tools they carried and used them to provide immediate cover. The trenches were subsequently occupied by other advancing infantry forces, and then by the firing line, lines of support and the reserves.⁹⁴ Importantly, as rear units advanced they strengthened the trenches. Kuhn also noted that the various villages in Manchuria supported establishment of hasty defensives. With an outer wall six to eight feet, they only offered limited cover, but reinforced an offensive mindset.⁹⁵

⁹¹War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 3 (Washington, DC: Government Printing, 1906), 111.

⁹²*Ibid.*

⁹³War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 3, 113.

⁹⁴*Ibid.*, 112.

⁹⁵In his description of the Japanese Second Army's attack at the Battle of Liaoyang, MAJ John Morrison briefly described the role of engineer operations to enable a rapid tempo against Russian

Lieutenant Colonel Walter Schuyler examined the Russian Army's use of fortifications. His observations were slightly different from Kuhn. Schuyler observed that, "the use of hasty intrenchments [sic] was not common in the early engagements of the war, but seemed to be a matter of gradual development."⁹⁶ Schuyler further argued that although the Russians focused on defensive positions initially, development of well-prepared defensive works appeared to go against their offensive mindset. He observed a Russian attack at the Sha River that featured a noticeable use of hasty entrenchments as Russian forces maneuvered into position for their final assault. The entrenchments were "constructed with the field-intrenching [sic] tools carried by the men and were entirely for kneeling or lying infantry, the batteries retaining their position in which they had been placed for the preparation of the attack."⁹⁷ Schuyler noted that the shallow field fortifications did not provide adequate protection to the soldiers, but the semi-permanent fortifications initially constructed by the Russians were also not adequate. The solution lied with the Japanese, whose trenches were narrower and offered quicker access to protection for advancing soldiers.⁹⁸ This enabled a high tempo for advancing forces, but allowed adequate force protection from shrapnel.

defenders. Prior to the movement of the Thirty-third Infantry Regiment, a section of engineers reinforced the lead battalion. To enable maneuver of infantry forces they were split between the company and platoon columns and tasked to clear Russian obstacles. As the unit reached the first set of obstacles in the early morning hours, the engineers focused on cutting enemy wire to make passages (see page 89). Once the engineers cleared the passages, they were tasked to disable mines further blocking their advance. Unfortunately, they had been unable to clear the mines, but Morrison understood their role. On page 97, he later described the Japanese mindset that "...believed it cheaper to hold on than go back." With limited cover, protection could be provided to a soldier on the ground. Although less of a focus in their reports than Kuhn, Morrison and Schuyler both clearly understood the relationship of engineer operations and fortifications to maintaining tempo and an offensive spirit.

⁹⁶War Department, *Reports of Military Observers Attached to the Armies in Manchuria During the Russo-Japanese War*, Part 1 (Washington, DC: Government Printing, 1906), 135.

⁹⁷Ibid.

⁹⁸Ibid.

Influence after the War

Like medical operations, the lessons of engineer operations during the Russo-Japanese War permeated through of professional military education and military journals. There was a deliberate effort at Fort Leavenworth to improve the study of fortifications, including an increased emphasis on their use to enable improved control of tempo during offensive and defensive operations. This emphasis included using fortifications that allowed an offensive mindset. Discussions in professional military journals reinforced this thinking. Both of these forums influenced a broad range of military officers by lessons learned in the war.

Institutional Education

At Fort Leavenworth, lessons related to fortifications began to directly influence engineer courses in the 1907-1908 academic year. Over the next few years, the study of fortifications gradually expanded at the school. This expansion of the study of fortifications would eventually include significant study on the use of fortifications to maintain tempo. In the Army and Staff College CPT J.A. Woodruff presented ten lectures during the 1907-1908 academic year. Various topics included fortifications, seacoast defenses and other engineer responsibilities. Three of the lectures were dedicated to the siege of Port Arthur. Another lecture focused on field fortifications of the war. A full 30% of the training days in the engineer courses were dedicated to studying field fortifications. The senior instructor noted that, “the Field Problems in Fortifications [courses] were...the most valuable addition made to the Staff Class course in this department.”⁹⁹

⁹⁹Army Service Schools, *Annual Report of the Commandant of the Army Service Schools at Fort Leavenworth for the School Year Ending August 31, 1908* (Fort Leavenworth, KS: Staff College Press, 1908), 77. Line officers were the primary audience of the field problems. The solutions involved artillery protection, obstacles, clearing, and a myriad of other tasks related to properly fortifying a position. CPT Edwin Cole, the senior instructor, stated, “these problems were highly satisfactory to the class, involving a work of a nature which had been previously neglected.”⁹⁹ Cole credited CPT Woodruff for much of the courses’ success.

The lessons of the war had clearly ignited the desire for increased study of fortifications on Fort Leavenworth.

Throughout the course in 1908, instructors referenced Woodruff's *Modern Methods of Fortifying a Position*.¹⁰⁰ Throughout the work, Woodruff examined several of the Japanese and Russian fortifications in detail. Woodruff also noted the value of machine guns in fortified positions. He argued that every fortress should employ a number of machine guns and "a few such weapons in an entrenched position permit of the greater part of the garrison being kept well under cover; for in the event of an assault they enable a heavy fire to be developed by their attendants."¹⁰¹ Almost exactly, as Kuhn described in his observations, Woodruff argued that the machine gun allowed a smaller number of troops to defend smaller works with short flanks. This action would inherently allow a higher tempo for those forces not engaged in defensive positions at the fortifications.

When describing various fortification profiles, Woodruff identified various fortifications tied to either defensive or offensive purposes. He argued that those for defensive purposes should utilize a deep and narrow trench. For offensive purposes the type of trench was preferable "not only because it affords good lateral communications and an easier exit, but because its more open construction is better suited to maintain a proper temper in troops to assume the offensive."¹⁰² Woodruff's work appears to be one of the first works used at the school, after the war, which demonstrated the benefit of fortifications to maintain tempo.

By 1910, Woodruff transitioned to the senior instructor position in the Department of Engineering for both the School of the Line and Army Staff College. He noted the continued

¹⁰⁰CPT E.E. Booth notes this on the last page of *Modern Methods of Fortifying a Position*. See J.A. Woodruff, *Modern Methods of Fortifying a Position* (Fort Leavenworth: Staff College Press, 1908).

¹⁰¹J.A. Woodruff, *Modern Methods of Fortifying a Position*, 14.

¹⁰²*Ibid.*, 17.

improvement of the field fortification course, which now included map problems, fortification studies, war games and a terrain exercise.¹⁰³ Like several other observers that preceded him, Joseph Kuhn arrived to Fort Leavenworth in 1910 to serve as an instructor. For that academic year, Kuhn served as the Assistant Commandant of the Army Field Engineer School, while also serving as the senior instructor in the Department of Engineering.¹⁰⁴ Importantly, as the official Corps of Engineer observer for the war, Kuhn could now directly influence engineering instruction at all four of the service schools on Fort Leavenworth.

In the 1911-1912 academic years, Kuhn further enhanced the instruction on field fortifications at the School of the Line. The weighting of field fortifications increased to count for 100 of the 250 points allotted to military engineering in the School of the Line.¹⁰⁵ Kuhn sought to bring “this important subject [field fortifications] in harmony with the most modern views as well as to establish its functions as a part of tactics in field operations.”¹⁰⁶ Crucial to the study of fortifications, and their relationship to tempo, was a new pamphlet: *Notes on Field Fortification*, prepared and published by Kuhn and his instructors. The influence of lessons from the war is obvious throughout the pamphlet. Instructors used the pamphlet in the classroom for map exercises and in the field for terrain exercises. A number of pages in the pamphlet describe the effect of fortifications on the offense, the defense and ultimately how fortifications could bridge the two forms of operation to maintain tempo on the battlefield.

Throughout the pamphlet, Kuhn’s interest with field fortifications during the offensive is obvious. This is hardly surprising given his documented observations from the war. Although conceptualized prior to the war, Kuhn argued that the campaign in Manchuria had shown that

¹⁰³ Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1910), 27.

¹⁰⁴ Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1911), 25.

¹⁰⁵ Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1912), 34.

¹⁰⁶ Army Service Schools, *Annual Report* (Fort Leavenworth, KS: Staff College Press, 1910), 34.

field fortifications have a significant role in offensive operations.¹⁰⁷ During operations, both sides seek the ability to maneuver and the power to do so, “whether strategically or tactically is essential to success and therefore compels an offensive action.”¹⁰⁸ This emphasis on the offensive was prevalent with Japanese forces throughout the war, who overcame the potential defensive spirit previously associated with field fortifications. Kuhn argued that unless facing an overwhelming force, the use of field fortifications must not limit the offensive spirit.¹⁰⁹ He wrote, “on the one hand clinging desperately with the spade to what they had won with rifle and on the other hand checking with their rifle the Russian attempts to drive them from their works.”¹¹⁰ Even in the defense, the spade was subordinate to the rifle and the offensive potential it brought to the battlefield.

Despite his interest in fortifications during offensive operations, Kuhn understood the importance of fortifications in the defense. Kuhn argued that the “concentration of all defensive measures on a single prepared line relying upon mobile supports and reserves for the necessary organization in depth” was the most preferable.¹¹¹ He also argued that although the offense was what would ultimately bring results on the battlefield, the enemy still warranted guarding. Units simply could not advance continuously on the modern battlefield in which fighting could last for days. Halts would occur to reassemble forces for follow on operations, whether they are offensive or defensive in nature. Kuhn saw the danger, however, of employing fortifications excessively, noting that “too early, too extensive, and too frequent use of field fortifications are certain to

¹⁰⁷ Army Field Engineer School, *Notes on Field Fortification* (Fort Leavenworth, KS: Staff College Press, 1912), 8.

¹⁰⁸ *Ibid.*, 5.

¹⁰⁹ Army Field Engineer School, *Notes on Field Fortification*, 8.

¹¹⁰ *Ibid.*

¹¹¹ *Ibid.*, 30.

injure the offensive spirit of leaders”¹¹² Not employing them, however, could lead to losses and potentially defeat.

Understanding the benefits of fortifications for the offense and defense, Kuhn spent considerable time discussing their interlocking benefits, specifically how they supported transitions between the offense and the defense. He believed that field fortifications could act as bridge between the two forms of operations to maintain a unit’s tempo. Kuhn argued, “field fortifications are a means to an end. In conjunction with maneuver and fire they constitute an instrument of tactics and should be employed only when and where required by the tactical situation.”¹¹³ He understood the need to balance the use of fortifications as their use significantly affected a unit’s tempo. While they could restrict the enemy’s ability to maneuver, they could do the opposite for friendly forces.¹¹⁴ He believed that the ability of maneuver must be maintained, fortifications should only be used to gain time or against a superior force. He argued, “the object of all fortifications should be to check the adversary’s power of maneuver with relatively small forces while at the same time facilitating our own maneuver.”¹¹⁵

While discussing the commander’s role in the use of fortifications, Kuhn argued that it was critical for commanders to understand the intent of the fortifications they employ. Was the objective to attack, to force the enemy to attack and determine his intentions, or are the fortifications being employed to gain time for a counterattack?¹¹⁶ If it was for the first purpose then only those forces not involved in the attack must occupy fortifications. If it was for the second, then officers must plan and resource fortifications. If it was the third purpose then

¹¹²Army Field Engineer School, *Notes on Field Fortification*, 9.

¹¹³Army Field Engineer School, *Notes on Field Fortification* (Fort Leavenworth, KS: Staff College Press, 1912), preface.

¹¹⁴*Ibid.*, 6.

¹¹⁵*Ibid.*, 8.

¹¹⁶*Ibid.*, 28.

fortifications must still be comprehensive. Otherwise, Kuhn argued, a force runs the same risk as the Russians, who failed properly employ fortifications and although successful in preventing frontal assaults, were overwhelmed on their flanks.¹¹⁷ While employing fortifications to achieve one of the objectives above, the commander must also balance the effectiveness of the speed of erecting hasty fortifications against the potential exhaustion of his troops.¹¹⁸ Kuhn saw a need for commanders to balance potential defensive culmination due to inadequate defenses against the inability to conduct offensive operations.

In the pamphlet, Kuhn also described his requirements for training related to fortification construction, something that directly corresponded to efforts at Fort Leavenworth. He argued that while construction of fortifications was easy, understanding their tactical employment was not.¹¹⁹ Kuhn believed that “in the modern battle with its extended front and long duration, the ever shifting phases of the combat will afford frequent opportunities for their application to the different leaders...down to the company officers.”¹²⁰ Importantly for his broad audience at Fort Leavenworth, he argued that troops, not engineers, played an extensive role in constructing fortifications on the modern battlefield.

It was critical that officers understood fortification employment and trained enlisted soldiers on constructing fortifications.¹²¹ When and how to employ “field fortifications in tactical operations without impairing the offensive spirit is often a delicate and difficult matter to decide and for this reason the art of applying hasty field works,” was one of the most difficult

¹¹⁷ Army Field Engineer School, *Notes on Field Fortification*, 29.

¹¹⁸ *Ibid.*, 38.

¹¹⁹ Army Field Engineer School, *Notes on Field Fortification*, 12.

¹²⁰ *Ibid.*

¹²¹ *Ibid.*, 9.

subjects.¹²² He also acknowledged that although troops were equipped with the equipment necessary to establish fortifications, training had been limited.¹²³ Given his opinion, his role as the senior engineer officer responsible for engineer instruction at all four schools on Fort Leavenworth was well suited to influence their tactical employment. Despite Kuhn's departure from Fort Leavenworth in August 1912, the emphasis on field fortifications and the influence of the Russo-Japanese War continued with his successors as his work remained a part of the curriculum for a number of years.

The influence of lessons of the war is also evident in the Army doctrine used in instruction at Fort Leavenworth. When discussing the defensive, the 1905 *Field Service Regulations* briefly described fortifications. It noted rather broad effects of fortifications, such as their use to strengthen defensive positions. It also stated fortifications allow better concentration of fire, preserve combat power, and preserve the morale of soldiers.¹²⁴ By the 1910 FSR, the growing influence of fortifications on the army is noticeable. The FSR now included a separate section on entrenchments. It stated that commanders at all levels should employ entrenchments at their discretion. The FSR also delineated the relationship of entrenchments in the offense and defense, "the primary object of intrenchments [sic] on the defensive is to enable a comparatively small part of a command to hold an extended front in order that the remainder may be available for offensive operations."¹²⁵ Units could maintain an offensive mindset and higher tempo by using fortifications to reduce their defensive requirements. Directly linked to the influence of the FSR was instruction at Fort Leavenworth. Kuhn published *Notes on Field Fortification* two years

¹²²Ibid.

¹²³Army Field Engineer School, *Notes on Field Fortification*, 9.

¹²⁴U.S. War Department, General Staff, *Field Service Regulations*, United States Army, 1905 (Washington, DC: Government Printing Office, 1905), 102.

¹²⁵U.S. War Department, General Staff, *Field Service Regulations, United States Army, 1910* (Washington, DC: Government Printing Office, 1910), 160.

after the 1910 FSR and expanded on many of its concepts regarding fortifications.¹²⁶

Informal Education in Print

Like medical operations, lessons learned from the war were also examined through articles in professional journals, although much less extensively, and typically on the broader subject of fortifications. One such article was “Land Defense of Seacoast Fortifications,” published in 1905. Although coastal fortifications were the primary focus of the author, the article demonstrated the emerging influence of the Russo-Japanese War and field fortifications. The author noted that the war had shown the importance of entrenched positions, particularly those concealed. He concluded the article by stating that the war, particularly the attack on Port Arthur, had shown that enemy forces would not be able to attack fortifications by water, but by land.¹²⁷ He further argued that the United States could therefore not rely on coastal defenses that only protect in the event of attack from the sea but must also be prepared to protect these key terrain from land. This was a clear shift in mindset for an army that had invested significant training, material, and education in coastal defense. The Army began to recognize the effects of field fortifications on the modern battlefield.

A second article that same year examined field and siege operations during the war in Manchuria. The author, Colonel William Livermore, was an engineer officer and argued that from the start of land operations “the Japanese had been careful to secure their positions by fortification and their lines of operation by good roads.”¹²⁸ He further stated that modern arms

¹²⁶Army Field Engineer School, *Notes on Field Fortification* (Fort Leavenworth, KS: Staff College Press, 1912), preface.

¹²⁷Edward Schulz, “Land Defense of Seacoast Fortifications,” *Journal of the Military Service Institution of the United States* 36, no. 133 (1905): 101.

¹²⁸William Livermore, “Field and Siege Operations in the Far East,” *Journal of the Military*

have extended the front across the peninsula and it had become difficult to classify these operations as a single campaign or continuous battle.¹²⁹ He noted that both the Russians and Japanese utilized entrenchments. This included trenches that allowed soldiers to stand and fire rather than just lie down.¹³⁰ Livermore, like Kuhn, also recognized the benefit of a thin line now being able to defend against a stronger force while another force could make a bolder move.¹³¹ This allowed an increased tempo with the larger force. COL Livermore quoted British observers to describe the siege of Port Arthur. Livermore stated what many students of the war had acknowledged, “although most of the methods and devices that have been developed in this war have long been known to military men, they have not all been put into practice on so extensive a scale.”¹³²

Two book reviews in the *Journal of the Military Service Institution of the United States* offered its readers two works by authors influenced by the war. Their works delve into fortifications in detail than previous works in the journal.¹³³ In 1908, the *JMIUS* reviewed the *Manual of Military Field Engineering* by W.D. Beach. Beach had previously served as an assistant commandant and instructor in the Department of Engineering at Fort Leavenworth. The review stated the necessity for a new edition of the work that allowed Beach to include recent

Service Institution of the United States 36, no. 133 (1905): 425.

¹²⁹William Livermore, “Field and Siege Operations in the Far East,” *Journal of the Military Service Institution of the United States* 36, no. 133 (1905): 427.

¹³⁰*Ibid.*, 434.

¹³¹*Ibid.*

¹³²William Livermore, “Field and Siege Operations in the Far East,” 440.

¹³³Interestingly the reviews recommend the journal’s readers doctrine utilized by the Service Schools, which expanded the influence of the doctrine well beyond the school grounds at Fort Leavenworth. This allowed both officers not attending the schools and interested civilians an opportunity to remain informed on emerging trends in engineering operations. In the preface of the first work, the author cited the *Journal of the Military Service Institute of the United States* as one of his sources, showing and interesting the link between professional journals, military doctrine, and Fort Leavenworth.

experiences from the Russo-Japanese War.¹³⁴ Profiles of field works and entrenchments were among the most prominent changes to the manual. Like the corresponding increased emphasis at Fort Leavenworth, Beach recognized the need training on fortifications. He specifically saw the need for line officers to understand the constructions of fortifications, bridging, and other engineer related tasks. He argued, “it is a truism to add that hasty intrenchments [sic] and field works if rightly constructed and their real function understood are useful servants, otherwise they are dangerous masters.”¹³⁵ He argued that the Russians’ deep, narrower trenches saved them from annihilation, which showed their advantage for the defense on the modern battlefield.¹³⁶ Importantly, he also noted the modern practice of using the broader, shallower trenches, which enabled the “defensive-offensive.”¹³⁷ These trenches allowed less protection, but cultivated a more offensive mindset by more rapidly increase tempo when transitioning from the defense to the offense.

A second book review presented journal readers with an additional work influenced by the war. The journal reviewed Woodruff’s *Applied Principles of Field Fortifications for Line Officers* in 1909. Woodruff consulted a number of observer reports and Army doctrinal publications. Much of the evidence presented in the work was actually direct quotes from the observer reports. In the work, Woodruff described the need for all soldiers, not just engineers, to understand the use of fortifications. Woodruff also understood the role of fortifications in the

¹³⁴E.F. Glenn, “Manual of Field Engineering,” *Journal of the Military Service Institution of the United States* 43, no. 154 (1908): 157.

¹³⁵W.D. Beach, *Manual of Military Field Engineering for the Use of Officers and Troops of the Line*, (Kansas City: Franklin Hudson Publishing Company, 1907) preface.

¹³⁶W.D. Beach, *Manual of Military Field Engineering for the Use of Officers and Troops of the Line*, (Kansas City: Franklin Hudson Publishing Company, 1907), 29. There are several sketches in the work, which showed Russian and Japanese fortifications. See page 32 in the *Manual of Military Field Engineering for the Use of Officers and Troops of the Line* for several sketches.

¹³⁷W.D. Beach, *Manual of Military Field Engineering for the Use of Officers and Troops of the Line*, (Kansas City: Franklin Hudson Publishing Company, 1907), 29.

defense and the offense. He quoted Kuhn when noting, “a defensive position properly prepared and skillfully adapted to the ground will impose upon the attack methods analogous to those employed in sieges, and this without recourse to any very elaborate works of construction.”¹³⁸

Importantly, Woodruff dedicated a chapter of the work on the specific use of fortifications during the offense. He wrote they will “generally be of a hasty and slight character, thrown up by its outposts for protection against sudden attack, and for the purpose of holding the ground then occupied, but soon to be abandoned in an advance movement.”¹³⁹ He argued that once the attacking force captured key terrain it must be able to transition from the offense to the defense. The attacking force must be able to entrench rapidly.¹⁴⁰ Woodruff used Kuhn’s observations to support his argument. Kuhn had noted Japanese forces’ employment of hasty entrenchments during the attack. To maintain tempo they were simple and dug by initial advancing forces to gain minimal cover. Subsequent advancing forces later occupied and improved the positions.¹⁴¹ Woodruff also used the notes of a Russian general to describe the Japanese employment of entrenchments. The Japanese forward line advanced on the double, dug, then advanced and repeated the process.¹⁴² This allowed temporary protection from enemy fire, but did not negate the offensive spirit or establish a slow tempo. Both Woodruff and Beach’s works show a growing influence of the war outside of Fort Leavenworth. Journal readers were clearly interested in the use of fortifications in the offense, defense, and their effect on tempo.

¹³⁸J.A. Woodruff, *Applied Principles of Field Fortifications for Line Officers* (Leavenworth, KS: Press of Ketcheson, 1909), 12.

¹³⁹*Ibid.*, 95.

¹⁴⁰J.A. Woodruff, *Applied Principles of Field Fortifications for Line Officers*, 96.

¹⁴¹*Ibid.*, 97.

¹⁴²*Ibid.*, 99.

WORLD WAR I

To evaluate accurately the influence of the lessons from the Russo-Japanese War it is important to examine operations on the battlefields of World War I. The war presented many similar characteristics as the Russo-Japanese War. There would be no decisive battle of annihilation for the Germans, but a protracted conflict fought in trenches along a broad front. The U.S. Army entered the war in 1917 with a desire to conduct sustained offensive operations. Both medical and engineer operations were required to enable this. A short examination of medical and engineer operations just prior to, and during the war, demonstrates how they improved ability of the U.S. Army to conduct sustained offensive operations.

Doctrine as the Army entered the war makes the desire for sustained offensive operations clear. The 1917 *Field Service Regulations* state, “decisive results are obtained only by the offensive. Aggressiveness wins battles. Forces should adopt the purely passive defense when it could fully accomplish the mission.”¹⁴³ If forced to the defense, the FSR states that it is temporary, and all or part of the forces must return to the offensive as soon as possible. Engineer operations would support this. “On the offensive intrenchments [sic] are used on all lines that are to be held for any length of time. Troops advancing must understand that the best protection against losses is afforded by an uninterrupted and vigorous advance...”¹⁴⁴ When the advance halted, forces would employ entrenchments. For medical operations, the 1917 placed added emphasis on the role of all officers and men in extending the culminating point of a unit. “Officers and men of all arms must have knowledge of sanitation and its importance, to the end

¹⁴³U.S. War Department, Office of the Chief of Staff, *Field Service Regulations, United States Army, 1914, Corrected to April 15, 1917* (Washington, DC: Government Printing Office, 1917), 73.

¹⁴⁴*Ibid.*, 79.

that no depletion of the fighting force occurs through avoidable causes.”¹⁴⁵ The FSR deemed commanders responsible for the sanitary conditions of their occupied areas and enforcement of all sanitary regulations.¹⁴⁶

The efficiency of medical operations during WWI was in stark contrast to the Spanish-American War. This is not to say that there were not significant challenges with hospitalization, evacuation, preventive medicine and every other functional area within the larger medical branch, but the advancements from a decade and a half prior were significant.¹⁴⁷ By June 1918, the AEF created a Line of Communications, later called the Services of Supply, to supervise all rear operations.¹⁴⁸ This allowed front line units to focus on conducting offensive operations and not on rear logistical operations. Like the efficient Japanese system during the Russo-Japanese War, this Services of Supply included supervision of stationary field hospitals and supply depots. During

¹⁴⁵U.S. War Department, Office of the Chief of Staff, *Field Service Regulations, United States Army, 1914, Corrected to April 15, 1917*, 152.

¹⁴⁶*Ibid.*, 152.

¹⁴⁷In its history of World War I published in 1923, the Army Medical Department notes that its power to care for the sick and wounded and prevent diseases was greater at the beginning of WWI than at the beginning of any previous war. (See Charles Lynch, Frank Weed, and Loy McAfee, *The Medical Department of the United States Army in the World War, Volume 1* (Washington DC, Government Printing Office), 5. Interestingly, one of the authors of this report, Col Charles Lynch, was the same Charles Lynch who served as an observer during the Russo-Japanese War. Interestingly, the work’s first chapters begin by bridging the decades between the Spanish-American War and World War I. The authors note that following the Russo-Japanese War, the Japanese Army Medical Department’s “organization and administrative details were carefully studied and were made use of in our subsequent regulations...” (55) The authors argue that the U.S. Army’s medical organization during WWI was partially organized based on experiences from the Russo-Japanese war and the preceding conflict in South Africa (65). The organization of the casualty evacuation system, along the lines of communication in the U.S. Army, was directly affected by the war. By 1910, the Army conceptually planned the evacuation system used in the World War I from the battalion aid station to the rear base hospital, with permanent units identified to manage the flow of wounded soldiers from the front to the rear hospitals (65). The war had also shown the advantage of an army with better sanitation practices. “It has been more clearly realized...that all of war does not consist of destroying the enemy at a blow, but partially preserving one’s own strength, so that ultimately the same result will be obtained in fuller measure.” (87) The authors’ highlight the desire of both modern line and medical officers to extend the culminating point of units at the front through an effective and efficient system of medical operations.

¹⁴⁸Edward Coffman, *The War to End all Wars: The American Military Experience in World War I* (New York: Oxford University Press, 1968), 129.

the war, medical operations for the evacuation of casualties at the division level varied based on units and “much was left to the initiative, discretion, and resourcefulness of the division surgeon and his subordinates.”¹⁴⁹ A common link to *Field Service Regulations* and other medical doctrine was evident however and both line and medical officers understood their roles.

Throughout the war, preventive medicine operations comprehensively addressed areas such as water purification, latrine management, food inspection and delousing.¹⁵⁰ Infectious diseases were challenging in Europe, as the French army had a massive outbreak of typhoid in their army during the war. Like preventive medicine today, medical personnel made great efforts at home station mobilization camps to inoculate soldiers prior to embarkation.¹⁵¹ As American battalions from the 1st Brigade, 1st Division occupied initial positions along the St. Mihiel salient in January 1918, the Brigade Commander and his subordinate commanders strongly emphasized sanitation.¹⁵²

A week before the St. Mihiel offensive later that September, planners extensively considered medical requirements in preparation for the campaign. Divisions knew their evacuation routes, hospital locations and patient triage procedures. Working with their French counterparts, planners arranged trains to facilitate the evacuation of wounded as close to the front as feasible. Planners estimated a requirement of casualty evacuation for 33,000 soldiers.¹⁵³ Once the offensive began, ambulance drivers encountered significant issues with mobility on the

¹⁴⁹Charles Lynch, Joseph Ford, and Frank Weed, *The Medical Department of the United States Army in the World War, Volume VIII* (Washington DC, Government Printing Office), <http://history.amedd.army.mil/booksdocs/wwi/divisionalmedsrvs/chapter4.html#TRENCHWARFARE> (accessed December 20, 2013).

¹⁵⁰Richard Ginn, *The History of the U.S. Army Medical Service Corps* (Washington, D.C: Office of the Surgeon General and Center of Military History, United States Army, 1997), 66.

¹⁵¹Mary Gillett, *The Army Medical Department 1917-1941*, 146.

¹⁵²Edward Coffman, *The War to End all Wars: The American Military Experience in World War I*, 145.

¹⁵³Mary Gillett, *The Army Medical Department 1917-1941*, 319.

battlefield. To alleviate such issues, divisions developed creative solutions such as having engineer squads repair roads used for casualty evacuation.¹⁵⁴ In the end, casualties for the operation were much lower than expected, less than 5,000, with only 158 soldiers dying from wounds.¹⁵⁵

The Meuse-Argonne campaign highlighted the American goal of sustained offensive operations during the war. As Edward Coffman describes, “it began with a gamble, continued through days of bloody, hammering attacks, and ended in a spectacular breakout.”¹⁵⁶ With a plan to rotate divisions into the offensive continuously, the scale of the attack required intermediate traffic control checkpoints to ensure control.¹⁵⁷ For medical operations, there would be significant challenges, including availability of only 18,000 beds and a shortage of 750 ambulances. Like the offensive at the St. Mihiel salient planners studied evacuations plan in details including routes and locations of thirty hospitals.¹⁵⁸ The ambulance shortage was particularly challenging given the high number of wounded.

For preventive medicine efforts, there were challenges with gas attacks, influenza, and other diseases.¹⁵⁹ The tempo of the campaign resulted in issues with personal hygiene and food and water-borne diseases. Measures such as delousing and chlorinating of water however

¹⁵⁴Mary Gillett, *The Army Medical Department 1917-1941*, 324.

¹⁵⁵*Ibid.*, 321.

¹⁵⁶Edward Coffman, *The War to End all Wars: The American Military Experience in World War I*, 299.

¹⁵⁷*Ibid.*, 303.

¹⁵⁸Mary Gillett, *The Army Medical Department 1917-1941*, 329.

¹⁵⁹The effects of the influenza on the force cannot be understated. 24,664 soldiers died in the war as a result of influenza. The effects if sanitation methods had been significantly changed since the Spanish-American War would have been far more devastating. For statistics see Charles Lynch, Joseph Ford, and Frank Weed, *The Medical Department of the United States Army in the World War, Volume II* (Washington DC, Government Printing Office, 1919), <http://history.amedd.army.mil/booksdocs/wwi/communicablediseases/chapter2.html> (accessed February 25, 2014).

eventually helped to reduce many of the issues.¹⁶⁰ Although criticized during the campaign, looking back at the culmination of V Corps in Cuba due largely to preventive medicine issues, medical operations had evolved significantly. Integration of medical and operational planning had clearly extended the culminating point of forces than previous conflicts.

The sheer number of overall casualties treated by the Army Medical Corps reinforced the need for this integrated planning. The number of admissions, or those admitted to a hospital or given quarters, was more than 2.5 million throughout the war. With an average daily strength of 760,726, the admission rate average for each soldier was 3.34 during the war.¹⁶¹ Given these numbers, the risk in failing to account for casualty admission rates during planning was significant. The overall rates for ineffectiveness also demonstrate the efforts to integrate. Although disease was the cause of 60-90% of the non-effective rates of forces during the war, it was largely the result of two diseases: epidemic diarrhea and influenza. In his report on sanitation during the war, COL Haven Emerson argued that it was doubtful any measures would have “prevented either of these two extensive epidemics among our troops.”¹⁶² The severity of the influenza epidemic, including its effect on military age personnel severely skewed any casualty statistics, particularly as it reached its highpoint during the Meuse Argonne campaign. More importantly, the overall “noneffective rate from disease, that is, the number of men in proportion to the strength of troops incapacitated from duty from other causes than battle casualties and injuries from accidents, etc., has been low.”¹⁶³

¹⁶⁰Mary Gillett, *The Army Medical Department 1917-1941*, 334.

¹⁶¹Albert G. Love, “War Casualties,” *The Army Medical Bulletin*, no. 24 (1931): 9.

¹⁶²Haven Emerson, “The Health and Sanitation of the Troops of the American Expeditionary Forces” in *Reports of the Commander-in-Chief, Staff Sections and Services Vol 15* (Washington DC: Center of Military History, United States Army, 1991), 372.

¹⁶³*Ibid.*

The use of fortifications to enable control of tempo during offensive and defensive operations is more challenging to evaluate than medical operations. French or British forces had emplaced much of the initial defensive fortifications used by U.S. Army forces. For offensive operations, U.S. forces routinely occupied German fortifications. When the great German offensive began in March 1918, Pershing deployed available American troops along the active front. This included the 1st Division, which was ordered to an area just west of Montdidier. Believing it faced an imminent attack, the division immediately prepared a defense with fortifications, including a 6,000-meter communication trench.¹⁶⁴ American forces launched their first offensive in the sector at Cantigny in May 1918. Engineers dug two trenches for the offensive, one for the assault troops and the other as a part of the deception plan. As American forces attacked and reached their objective, supporting artillery was withdrawn and German artillery quickly followed. To increase survivability of assaulting troops and facing machine gun and artillery fire, engineers built three fortified positions in just a few hours.¹⁶⁵

To execute sustained offensive operations during the southern attack of the St. Mihiel offensive in early September 1918, American forces faced a different challenge with fortifications. Pershing described the salient as a great fortress of which the Germans had spent four years strengthening “the natural defensive features by elaborate fortifications and by a dense network of barbed wire that cover the entire front.”¹⁶⁶ Planners deemed a primary attack from the south supported by an attack from the west as the best option. To maintain tempo, units had to overcome German fortifications quickly. Lacking the heavy tanks of the other allies and not wanting to alert the Germans through days of artillery barrages, artillery was limited to

¹⁶⁴Kenneth Deacon, “Cantigny-The First American Offensive, 1918,” in *Fighting Elite*, ed. Franklin Davis and Thomas Jones (New York: Franklin Watts, 1967), 109.

¹⁶⁵Kenneth Deacon, “Cantigny-The First American Offensive, 1918,” 110.

¹⁶⁶John Pershing, *My Experiences in the World War, Volume II* (New York: Frederick A. Stokes Co, 1931), 263.

preliminary fire for four hours.¹⁶⁷ Engineers maneuvered forward with bangalores and wire cutters to create a route for follow on troops. Efforts like this allowed the 82d division to achieve their second day objectives by the first evening.¹⁶⁸ Once forces reached their final objectives on September 13, they immediately began fortifying their positions for the defense against German counterattacks that soon came. The intent of the defense was not to simply protect the entire army along the front, but instead to enable other offensive operations. Pershing argued that the defense allowed “the withdrawal of division and corps troops for participation in the Meuse-Argonne battle.”¹⁶⁹

With the Meuse-Argonne campaign, the AEF employed more than one million men who initially operated over a 24-mile front that grew to 90 miles. Once the battle began, Pershing desired that “the battle was maintained continuously, aggressively, and relentlessly to the end.”¹⁷⁰ Before the enemy could bring up strong reinforcements he wanted to maneuver past the enemy’s first and second positions near Montfaucon and reach his third objective of the nearby heights.”¹⁷¹ To do so would initially require the maintenance an aggressive tempo for ten miles over a fortified area. By late October, the campaign switched to open warfare until the army reached the heights overlooking Sedan on 7 November. The entire operation lasted 47 days. Throughout the campaign, in what became a seemingly endless rotation, AEF units would attack, attempt to seize German positions, and fortify their own lines prior to a German counterattack or relief by another division.¹⁷²

¹⁶⁷ John Pershing, *My Experiences in the World War, Volume II*, 265.

¹⁶⁸ *Ibid.*, 268.

¹⁶⁹ *Ibid.*, 270.

¹⁷⁰ John Pershing, *My Experiences in the World War, Volume II*, 295.

¹⁷¹ *Ibid.*, 293.

¹⁷² *Ibid.*, 332-334.

When discussing the roles of engineers in sustained offensive operations the Corps Engineer for 2nd Corps, A.E.F., Colonel G.B. Pillsbury argued, “the effort of all other branches is devoted to assisting the advance of the infantry.”¹⁷³ Interestingly the entire article is devoted to the advance, as the author admits no experience in the defense. Pillsbury argued that bridging and roads maintenance were important engineer functions that supported sustained offensive operations. Opening and maintaining roads was the largest consumer of engineer personnel, as they were vital to the movement of large bodies of troops. Focus was initially on clearing small obstacles, repair of shelled portions, and finally operations to remove large obstacles.¹⁷⁴ To provide support, engineers were task organized in two schemes. Either infantry regiments or brigades were directly attached engineer units to support their advance or the engineers were task organized in road repair teams that supported operations throughout the division area. Pillsbury argued that accurate reconnaissance and liaison with supported units was vital to synchronizing timely support during the advance. To support the advance engineers would also assume tasks normally outside their functions. Until relief by military police units, traffic control was initially an engineer task as they cleared smaller obstacles.¹⁷⁵ In order to provide continuous support, division engineer elements would often begin but not complete projects that supported the advance of their assigned units.

Another major role of engineers supporting the advance was the engineer role in bridging. Colonel Pillsbury argued that division engineers were “directly responsible to their Division Commanders for getting the infantry and artillery of their divisions over the

¹⁷³G.B Pillsbury, “Engineer Troops in an Advance,” Professional Memoirs: Corps of Engineers, United States Army and Engineer Department at Large, no.55 (January-February 1919): 675.

¹⁷⁴Ibid.

¹⁷⁵G.B Pillsbury, “Engineer Troops in an Advance,”684.

obstruction.”¹⁷⁶ To ensure adequate resourcing, an important task of the engineer was to determine requirements for pontoon bridges prior to an advance.¹⁷⁷ Commanders directed engineers to emplace emergency bridges to allow emplacement of long term bridging later. Pillsbury was keenly aware of the temporal conditions of an advance, as he argued, “under no circumstance should the ordering of material be delayed beyond the day when site comes in our possession. It should be on the road, in trucks, that night.”¹⁷⁸ In an effort to capture other operations related to supporting the advance, Pillsbury also briefly discussed the tasks of mine clearing, water supply management, and reconnaissance in supporting the advance. Pillsbury’s article demonstrates that while the use of fortifications to increase tempo in the offensive appeared limited during the war, there was still the influence of broader educational emphasis that engineer efforts were to support tempo in the offensive. This assisted officers in developing a myriad of ways for engineer operations to play a role in sustained offensive operations.

CONCLUSION

At the end of the nineteenth century, the U.S. Army transitioned from a force policing the American frontier to one fighting a guerilla war in the Philippines. Although the Spanish-American War concluded quickly in 1898, the subsequent Philippine-American War lasted until 1902. This occurred as the British fought a guerilla war of their own in South Africa against the Boers from 1899-1902. By 1903, the U.S. Army appeared at a crossroads as it searched for its identity. Unsurprisingly when the Russo-Japanese War began in 1904, a number of U.S. Army officers rushed to observe it. Like the Arab-Israeli War seventy years later, the Russo-Japanese War presented the U.S. Army with a conventional war that served as a precursor to its own war

¹⁷⁶G.B Pillsbury, “Engineer Troops in an Advance,” 687.

¹⁷⁷Ibid., 688.

¹⁷⁸Ibid., 689.

on the modern battlefield in 1917.¹⁷⁹ Observers were quick to gather lessons and present them to an eager military audience at home. Lessons concerned everything from the effect of artillery on the modern battlefield to the mass mobilization of conventional armies. In these lessons lied a particular appreciation of the Japanese army's ability to conduct sustained offensive operations.

The observers examined several functional areas in depth that supported the Japanese ability to conduct these operations. Two of these functional areas were medical and engineer operations. The Japanese success with casualty evacuation procedures and preventive medicine demonstrated that Army leaders and planners could not treat medical operations as an afterthought to tactical operations. To extend the culminating point of forces the Army recognized that both line and medical officers must better understand their roles in medical operations, particularly preventive medicine and casualty evacuation procedures. In order to achieve this, a deliberate effort began at Fort Leavenworth to integrate medical and tactical operations and promote the roles of line and medical officers in the process. Discussions in professional military journals reinforced this reform. In engineer operations, these lessons led to an increased emphasis on the use of fortifications to enable improved control of tempo during offensive and defensive operations. Like medical operations, there was a deliberate effort at Fort Leavenworth to engrain these changes through professional education. Discussions in professional military journals also reinforced this effort.

As the United States Army entered World War I, the prevailing desire was to conduct sustained offensive operations. As the U.S. entered the war, doctrine had already codified many of the lessons from the war, including medical and engineer operations that supported this desire. The sheer number of soldiers and scale of operations would have been unsupportable using methods from the Spanish-American War. Both commanders and planners understood the

¹⁷⁹For the influence of the 1973 war, see Saul Bronfeld, "Fighting Outnumbered: The Impact of the Yom Kippur War on the U.S. Army," *The Journal of Military History* 71, no. 2 (April 2007): 465-98.

importance of medical operations, with commanders placing increased scrutiny on sanitation and planners incorporating medical considerations during campaign planning.

Although the opposing forces of World War I had established elaborate defensive fortifications throughout the Western front, American Army leaders eyed engineers operations as a method to support the advance of forces. American forces continuously erected new fortifications as they seized terrain. This limited the required numbers of troops for the defense and freed forces for other offensive operations. The use of engineer operations to support the advance also included tasks such as road building and bridging. Regardless of the amount of fortifications employed during the war, the emphasis on using engineer operations to support tempo in the offensive was apparent.

As several prominent historians of the war have argued, the Russo-Japanese remains one of the least explored conflicts of the twentieth century. For Americans, the Spanish-American War, of which the U.S was a participant, has largely overshadowed it. While this paper explored the war's influence on medical and engineer operations in the U.S. Army, there remains much more to be examined. The influence of the observers at both high levels of the U.S. Army and at Fort Leavenworth for two decades after the war was tremendous. The number of articles in professional journals for ten years after the war is countless. With those considerations, determining the full extent of the war's influence will be an endeavor for years to come.

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